

**AMENDMENT OF THE CLAIMS**

This listing of claims will replace all prior versions and listings of the claims in the application:

Claim 1 (Original): An isolated porcine adenovirus sequence essential for encapsidation that comprises a nucleotide sequence selected from the group consisting of AAATT; ATTTT; TATT; TATTTT; TATATA; TTTT; TATTTT; ATATT; TTTA; AATTTTA; ATTTT; and TATTTATT.

Claim 2 (Currently amended): The porcine adenovirus sequence essential for encapsidation of claim 1 wherein said nucleotide sequence comprises a nucleotide sequence selected from the group consisting of:

Motif I represented by  $X_I AAATTY_I$ , wherein  $X_I$  is selected from the group consisting of G, GG, CGG, GCGG, and GCGGG, and wherein  $Y_I$  is selected from the group consisting of CCCGCACA, CCCGCAC, CCCGCA, CCCGC, CCCG, CCC, CC and C (SEQ ID NOS: 1, 2, 91, 103-139);

Motif II represented by  $X_{II} ATTTTY_{II}$ , wherein  $X_{II}$  is selected from the group consisting of G, GG, GGG, CGGG, and GCGGG, and wherein  $Y_{II}$  is selected from the group consisting of GTGCCCTCT, GTGCCCTC, GTGCCCT, GTGCCC, GTGCC, GTGC, GTG, GT and G (SEQ ID NOS: 3, 4, 95, 140-181);

Motif III represented by  $X_{III} TATTY_{III}$ , wherein  $X_{III}$  is selected from the group consisting of G, GG, CGG, CCGG, and CCCGG, and wherein  $Y_{III}$  is selected from the group consisting of CCCCACCTG, CCCCACCT, CCCCACC, CCCCAC, CCCCCA, CCCCC, CCC, CC, and C (SEQ ID NOS: 5, 6, 97, 182-223);

Motif IV represented by  $X_{IV} TATTTTTY_{IV}$ , wherein  $X_{IV}$  is selected from the group consisting of G, TG, GTG, GGTG, and GGGTG, and wherein  $Y_{IV}$  is selected from the group consisting of CCCCTCA, CCCCTC, CCCCT, CCCC, CCC, CC, and C (SEQ ID NOS: 7, 8, 100, 224-255);

Motif V represented by  $X_V TATATAY_V$ , wherein  $X_V$  is selected from the group consisting of G, TG, GTG, AGTG, and CAGTG, and wherein  $Y_V$  is selected from the group

consisting of GTCCGCGC, GTCCGCG, GTCCGC, GTCCG, GTCC, GTC, GT and G (SEQ ID NOS: 9, 10, 101, 256-292); and

Motif VI represented by  $X_{VI}TTTTY_{VI}$ , wherein  $X_{VI}$  is selected from the group consisting of G, AG, GAG, AGAG, and TAGAG, wherein  $Y_{VI}$  is selected from the group consisting of CTCTCAGCG, CTCTCAGC, CTCTCAG, CTCTCA, CTCTC, CTCT, CTC, CT and C (SEQ ID NOS: 11, 12, 99, 102, 293-333).

Claim 3 (Currently amended): The porcine adenovirus sequence essential for encapsidation of claim 1 wherein said sequence comprises a nucleotide sequence selected from the group consisting of:

Motif 1 represented by  $X_1TATTTY_1$ , wherein  $X_1$  is selected from the group consisting of G, GG, TGG, and CTGG, and wherein  $Y_1$  is selected from the group consisting of C, CC, CCA, and CCAC (SEQ ID NOS: 13, 334-348);

Motif 2 represented by  $X_2ATATY_2$ , wherein  $X_2$  is selected from the group consisting of G, TG, and GTG, and wherein  $Y_2$  is selected from the group consisting of G and GG (SEQ ID NOS: 14, 349-353);

Motif 3 represented by  $X_3TTTAY_3$ , wherein  $X_3$  is selected from the group consisting of C and CC, and wherein  $Y_3$  is selected from the group consisting of C, CC, CCT, CCTG, CCTGG, and CCTGGG (SEQ ID NOS: 15, 354-364);

Motif 4 represented by  $X_4AATTTAY_4$ , wherein  $X_4$  is selected from the group consisting of C, TC, and CTC, and wherein  $Y_4$  is selected from the group consisting of C, CC, CCA, and CCAC (SEQ ID NOS: 16, 365-375);

Motif 5 represented by  $X_5ATTTTTY_5$ , wherein  $X_5$  is selected from the group consisting of G, CG, TCG, GTCG, and GGTCG, and wherein  $Y_5$  is selected from the group consisting of C, CC, CCA, and CCAC (SEQ ID NOS: 17, 376-394); and

Motif 6 represented by  $X_6TATTTATY_6$ , wherein  $X_6$  is selected from the group consisting of C, CC, and CCC, and wherein  $Y_6$  is selected from the group consisting of C, CT, CTG, CTGC, CTGCG, CTGCGC, and CTGCGCG (SEQ ID NOS: 18, 20, 395-413).

Claim 4 (Original): The porcine adenovirus sequence essential for encapsidation of claim 1 wherein said sequence is a porcine adenovirus 3 sequence.

Claim 5 (Original): The porcine adenovirus sequence essential for encapsidation of claim 1 wherein said sequence is a porcine adenovirus 5 sequence.

Claim 6 (Currently amended): The porcine adenovirus sequence essential for encapsidation of claim 1 wherein said sequence comprises a nucleotide sequence selected from the group consisting of:

CGGAAATTCCCGCACA (SEQ ID NO: 1);  
GGCGGAAATTCCCGCACA (SEQ ID NO: 2);  
GGGATTTTGTGCCCTCT (SEQ ID NO: 3);  
GCGGGATTTTGTGCCCTCT (SEQ ID NO: 4);  
CGGTATTCCCCACCTG (SEQ ID NO: 5);  
CCCGGTATTCCCCACCTG (SEQ ID NO: 6);  
GTGTATTTTTTCCCCTCA (SEQ ID NO: 7);  
GGGTGTATTTTTTCCCCTCA (SEQ ID NO: 8);  
GTGTATATAGTCCGCGC (SEQ ID NO: 9);  
CAGTGTATATAGTCCGCGC (SEQ ID NO: 10);  
GAGTTTTCTCTCAGCG (SEQ ID NO: 11); and  
TAGAGTTTTCTCTCAGCG (SEQ ID NO: 12).

Claim 7 (Currently amended): The porcine adenovirus sequence essential for encapsidation of claim 1 wherein said sequence comprises a nucleotide sequence selected from the group consisting of:

CTGGTATTTTCCAC (SEQ ID NO: 13);  
GTGATATTGG (SEQ ID NO: 14);  
CCTTTACCTGGG (SEQ ID NO: 15);  
CTCAATTTTACCAC (SEQ ID NO: 16);

GGTCGATTTTCCAC (SEQ ID NO: 17); and  
CCCTATTATTCTGCGCG (SEQ ID NO: 18).

Claim 8 (Original): A recombinant adenovirus vector comprising an isolated porcine adenovirus sequence essential for encapsidation that comprises a nucleotide sequence selected from the group consisting of AAATT; ATTTT; TATT; TATTTT; TATATA; TTTT; TATTTT; ATATT; TTTA; AATTTA; ATTTT; and TATTTATT.

Claim 9 (Currently amended): The recombinant adenovirus vector of claim 8 wherein said porcine adenovirus sequence essential for encapsidation comprises a nucleotide sequence selected from the group consisting of:

Motif I represented by  $X_I AAATTY_I$ , wherein  $X_I$  is selected from the group consisting of G, GG, CGG, GCGG, and GGCGG, and wherein  $Y_I$  is selected from the group consisting of CCCGCACA, CCCGCAC, CCCGCA, CCCGC, CCCG, CCC, CC and C (SEQ ID NOS: 1, 2, 91, 103-139);

Motif II represented by  $X_{II} ATTTY_{II}$ , wherein  $X_{II}$  is selected from the group consisting of G, GG, GGG, CGGG, and GCGGG, and wherein  $Y_{II}$  is selected from the group consisting of GTGCCCTCT, GTGCCCTC, GTGCCCT, GTGCCC, GTGCC, GTGC, GTG, GT and G (SEQ ID NOS: 3, 4, 95, 140-181);

Motif III represented by  $X_{III} TATTY_{III}$ , wherein  $X_{III}$  is selected from the group consisting of G, GG, CGG, CCGG, and CCCGG, and wherein  $Y_{III}$  is selected from the group consisting of CCCCACCTG, CCCCACCT, CCCCACC, CCCCAC, CCCCCA, CCCC, CCC, CC, and C (SEQ ID NOS: 5, 6, 97, 182-223);

Motif IV represented by  $X_{IV} TATTTTTY_{IV}$ , wherein  $X_{IV}$  is selected from the group consisting of G, TG, GTG, GGTG, and GGGTG, and wherein  $Y_{IV}$  is selected from the group consisting of CCCCTCA, CCCCTC, CCCCT, CCCC, CCC, CC, and C (SEQ ID NOS: 7, 8, 100, 224-255);

Motif V represented by  $X_V TATATAY_V$ , wherein  $X_V$  is selected from the group consisting of G, TG, GTG, AGTG, and CAGTG, and wherein  $Y_V$  is selected from the group

consisting of GTCCGCGC, GTCCGCG, GTCCGC, GTCCG, GTCC, GTC, GT and G (SEQ ID NOS: 9, 10, 101, 256-292); and

Motif VI represented by  $X_{VI}TTTTY_{VI}$ , wherein  $X_{VI}$  is selected from the group consisting of G, AG, GAG, AGAG, and TAGAG, wherein  $Y_{VI}$  is selected from the group consisting of CTCTCAGCG, CTCTCAGC, CTCTCAG, CTCTCA, CTCTC, CTCT, CTC, CT and C (SEQ ID NOS: 11, 12, 99, 102, 293-333).

Claim 10 (Currently amended): The recombinant adenovirus vector of claim 8 wherein said porcine adenovirus sequence essential for encapsidation comprises a nucleotide sequence selected from the group consisting of:

Motif 1 represented by  $X_1TATTTY_1$ , wherein  $X_1$  is selected from the group consisting of G, GG, TGG, and CTGG, and wherein  $Y_1$  is selected from the group consisting of C, CC, CCA, and CCAC (SEQ ID NOS: 13, 334-348);

Motif 2 represented by  $X_2ATATY_2$ , wherein  $X_2$  is selected from the group consisting of G, TG, and GTG, and wherein  $Y_2$  is selected from the group consisting of G and GG (SEQ ID NOS: 14, 349-353);

Motif 3 represented by  $X_3TTTAY_3$ , wherein  $X_3$  is selected from the group consisting of C and CC, and wherein  $Y_3$  is selected from the group consisting of C, CC, CCT, CCTG, CCTGG, and CCTGGG (SEQ ID NOS: 15, 354-364);

Motif 4 represented by  $X_4AATTTTAY_4$ , wherein  $X_4$  is selected from the group consisting of C, TC, and CTC, and wherein  $Y_4$  is selected from the group consisting of C, CC, CCA, and CCAC (SEQ ID NOS: 16, 365-375);

Motif 5 represented by  $X_5ATTTTTY_5$ , wherein  $X_5$  is selected from the group consisting of G, CG, TCG, GTCG, and GGTCG, and wherein  $Y_5$  is selected from the group consisting of C, CC, CCA, and CCAC (SEQ ID NOS: 17, 376-394); and

Motif 6 represented by  $X_6TATTTATTY_6$ , wherein  $X_6$  is selected from the group consisting of C, CC, and CCC, and wherein  $Y_6$  is selected from the group consisting of C, CT, CTG, CTGC, CTGCG, CTGCGC, and CTGCGCG (SEQ ID NOS: 18, 20, 395-413).

Claim 11 (Original): A replication-defective recombinant adenovirus vector which comprises an isolated porcine adenovirus sequence(s) essential for encapsidation, wherein said sequence essential for encapsidation comprises a nucleotide sequence selected from the group consisting of AAATT; ATTTT; TATT; TATTTT; TATATA; TTTT; TATTTT; ATATT; TTAA; AATTTA; ATTTT; and TATTTATT.

Claim 12 (Original): The recombinant adenovirus vector of claim 11, wherein said porcine adenovirus sequence(s) essential for encapsidation is heterologous to said adenovirus vector.

Claim 13 (Original): The recombinant adenovirus vector of claim 12 wherein said adenovirus vector comprises human adenoviral sequences.

Claim 14 (Original): The recombinant adenovirus vector of claim 12 wherein said adenovirus vector comprises bovine adenoviral sequences.

Claim 15 (Currently amended): The recombinant adenovirus vector of claim 11 wherein said sequence essential for encapsidation comprises a nucleotide sequence selected from the group consisting of:

Motif I represented by  $X_I AAATTY_I$ , wherein  $X_I$  is selected from the group consisting of G, GG, CGG, GCGG, and GGCGG, and wherein  $Y_I$  is selected from the group consisting of CCCGCACA, CCCGCAC, CCCGCA, CCCGC, CCCG, CCC, CC and C (SEQ ID NOS: 1, 2, 91, 103-139);

Motif II represented by  $X_{II} ATTTTY_{II}$ , wherein  $X_{II}$  is selected from the group consisting of G, GG, GGG, CGGG, and GCGGG, and wherein  $Y_{II}$  is selected from the group consisting of GTGCCCTCT, GTGCCCTC, GTGCCCT, GTGCCC, GTGCC, GTGC, GTG, GT and G (SEQ ID NOS: 3, 4, 95, 140-181);

Motif III represented by  $X_{III} TATTY_{III}$ , wherein  $X_{III}$  is selected from the group consisting of G, GG, CGG, CCGG, and CCCGG, and wherein  $Y_{III}$  is selected from the group

consisting of CCCCACCTG, CCCCACCT, CCCCACC, CCCCAC, CCCCCA, CCCC, CCC, CC, and C (SEQ ID NOS: 5, 6, 97, 182-223);

Motif IV represented by  $X_{IV}TATTTTTTY_{IV}$ , wherein  $X_{IV}$  is selected from the group consisting of G, TG, GTG, GGTG, and GGGTG, and wherein  $Y_{IV}$  is selected from the group consisting of CCCCTCA, CCCCTC, CCCCT, CCCC, CCC, CC, and C (SEQ ID NOS: 7, 8, 100, 224-255);

Motif V represented by  $X_VTATATAY_V$ , wherein  $X_V$  is selected from the group consisting of G, TG, GTG, AGTG, and CAGTG, and wherein  $Y_V$  is selected from the group consisting of GTCCGCGC, GTCCGCG, GTCCGC, GTCCG, GTCC, GTC, GT and G (SEQ ID NOS: 9, 10, 101, 256-292); and

Motif VI represented by  $X_{VI}TTTTTY_{VI}$ , wherein  $X_{VI}$  is selected from the group consisting of G, AG, GAG, AGAG, and TAGAG, wherein  $Y_{VI}$  is selected from the group consisting of CTCTCAGCG, CTCTCAGC, CTCTCAG, CTCTCA, CTCTC, CTCT, CTC, CT and C (SEQ ID NOS: 11, 12, 99, 102, 293-333).

Claim 16 (Currently amended): The recombinant adenovirus vector of claim 11 wherein said porcine adenovirus sequence essential for encapsidation comprises a nucleotide sequence selected from the group consisting of:

Motif 1 represented by  $X_1TATTTTTY_1$ , wherein  $X_1$  is selected from the group consisting of G, GG, TGG, and CTGG, and wherein  $Y_1$  is selected from the group consisting of C, CC, CCA, and CCAC (SEQ ID NOS: 13, 334-348);

Motif 2 represented by  $X_2ATATTY_2$ , wherein  $X_2$  is selected from the group consisting of G, TG, and GTG, and wherein  $Y_2$  is selected from the group consisting of G and GG (SEQ ID NOS: 14, 349-353);

Motif 3 represented by  $X_3TTTAY_3$ , wherein  $X_3$  is selected from the group consisting of C and CC, and wherein  $Y_3$  is selected from the group consisting of C, CC, CCT, CCTG, CCTGG, and CCTGGG (SEQ ID NOS: 15, 354-364);

Motif 4 represented by  $X_4AATTTTAY_4$ , wherein  $X_4$  is selected from the group consisting of C, TC, and CTC, and wherein  $Y_4$  is selected from the group consisting of C, CC, CCA, and CCAC (SEQ ID NOS: 16, 365-375);

Motif 5 represented by  $X_5ATTTTTY_5$ , wherein  $X_5$  is selected from the group consisting of G, CG, TCG, GTCG, and GGTCG, and wherein  $Y_5$  is selected from the group consisting of C, CC, CCA, and CCAC (SEQ ID NOS: 17, 376-394); and

Motif 6 represented by  $X_6TATTTATTY_6$ , wherein  $X_6$  is selected from the group consisting of C, CC, and CCC, and wherein  $Y_6$  is selected from the group consisting of C, CT, CTG, CTGC, CTGCG, CTGCGC, and CTGCGCG (SEQ ID NOS: 18, 20, 395-413).

Claim 17 (Original): The recombinant adenovirus vector of claim 11 which further comprises at least one nucleic acid sequence encoding a transgene.

Claim 18 (Original): The recombinant vector of claim 11 which further comprises at least one inverted terminal repeat sequence from a human adenovirus.

Claim 19 (Original): The recombinant vector of claim 11 which further comprises at least one inverted terminal repeat sequence from a bovine adenovirus.

Claim 20 (Original): The recombinant adenovirus vector of claim 11 wherein said adenovirus vector comprises at least one isolated porcine adenovirus sequence(s) essential for encapsidation, at least one inverted terminal repeat sequence and nucleic acid encoding a transgene, wherein said adenovirus vector is deleted in a nucleic acid sequence encoding an adenovirus protein.

Claim 21 (Original): The recombinant adenovirus vector of claim 12, wherein said adenovirus vector comprises a human adenovirus sequence, a porcine adenovirus sequence, or bovine adenovirus sequences.



Claim 22 (Original): The recombinant adenovirus vector of claim 20 wherein said transgene encodes an immunogenic polypeptide.

Claim 23 (Original): The recombinant adenovirus vector of claim 20 wherein said transgene encodes an antigen of a pathogen.

Claim 24 (Original): The recombinant adenovirus vector of claim 23 wherein said pathogen is a human pathogen.

Claim 25 (Original): The recombinant adenovirus vector of claim 23 wherein said pathogen includes a bovine pathogen, porcine pathogen, canine pathogen, feline pathogen or equine pathogen.

Claim 26 (Original): A recombinant porcine adenovirus vector which comprises a deletion of a porcine adenovirus sequence essential for encapsidation, wherein said sequence essential for encapsidation comprises a nucleotide sequence selected from the group consisting of AAATT; ATTTT; TATT; TATTTT; TATATA; TTTT; TATTTT; ATATT; TTAA; AATTTA; ATTTT; and TATTTATT.

Claim 27 (Original): The recombinant porcine adenovirus vector of claim 26 wherein said porcine adenovirus is PAV3.

Claim 28 (Original): The recombinant porcine adenovirus vector of claim 26 wherein said porcine adenovirus is PAV5.

Claim 29 (Original): A host cell comprising the adenovirus vector of claim 11.

Claim 30 (Original): A host cell comprising the adenovirus vector of claim 26.

Claim 31 (Original): The host cell of claim 29 which is mammalian.

Claim 32 (Original): The host cell of claim 30 which is mammalian.

Claim 33 (Original): A recombinant adenovirus particle comprising the adenovirus vector of claim 11.

Claim 34 (Original): A recombinant adenovirus particle comprising the adenovirus vector of claim 26.

Claim 35 (Original): A composition comprising the adenoviral vector of claims 11.

Claim 36 (Original): A composition comprising the adenoviral vector of claims 26.

Claim 37 (Original): The composition of claim 35 further comprising a pharmaceutically acceptable carrier.

Claim 38 (Original): The composition of claim 35 or 36 further comprising a pharmaceutically acceptable carrier.

Claim 39 (Original): A composition capable of inducing an immune response in a mammalian subject, said composition comprising an adenovirus vector of claim 11 or claim 26 and a pharmaceutically acceptable excipient.

Claim 40 (Original): A method for eliciting an immune response in a mammalian subject comprising administering a composition of claim 35 and a pharmaceutically acceptable excipient to said mammalian subject.

Claim 41 (Original): A method for eliciting an immune response in a mammalian subject comprising administering a composition of claim 36 and a pharmaceutically acceptable excipient to said mammalian subject.

Claim 42 (Original): A recombinant porcine adenovirus vector comprising a deletion and/or addition of part or all of one or more E1 transcriptional control regions.

Claim 43 (Original): The recombinant porcine adenovirus vector of claim 42 wherein said E1 transcriptional control region comprises from about nucleotide 252 to about nucleotide 313 of PAV-3.

Claim 44 (Original): The recombinant porcine adenovirus vector of claim 42 wherein said E1 transcriptional control region comprises from about nucleotide 382 to about nucleotide 433 of PAV-3.

Claim 45 (Original): The recombinant porcine adenovirus vector of claim 42 wherein said E1 transcriptional control region comprises from about nucleotide 432 to about nucleotide 449 of PAV-3.

Claim 46 (Original): The recombinant porcine adenovirus vector of claim 42 wherein said E1 transcriptional control region comprises from about nucleotide 312 to about nucleotide 382 of PAV-3.

Claim 47 (Original): The recombinant porcine adenovirus vector of claim 42 wherein said E1 transcriptional control region comprises from about nucleotide 312 to about nucleotide 449 of PAV-3.

Claim 48 (Original): The recombinant porcine adenovirus vector of claim 42 wherein said E1 transcriptional control region comprises from about nucleotide 252 to about nucleotide 449 of PAV-3.

Claim 49 (Original): The recombinant porcine adenovirus vector of claim 42 wherein said E1 transcriptional control region comprises from about nucleotide 371 to about nucleotide 432 of PAV-3.

Claim 50 (Original): A host cell comprising a porcine adenovirus vector of claim 42.

Claim 51 (Original): A composition comprising a porcine adenovirus vector of claim 42.

Claim 52 (Original): The composition of claim 51 further comprising a pharmaceutically acceptable carrier.

Claim 53 (Original): A recombinant adenovirus particle comprising the adenovirus vector of claim 42.

Claim 54 (Original): A composition capable of inducing an immune response in a mammalian subject, said composition comprising an adenovirus vector of claim 42 and a pharmaceutically acceptable excipient.

Claim 55 (Original): A method for eliciting an immune response in a mammalian subject comprising administering a composition of claim 42 and a pharmaceutically acceptable excipient to said mammalian subject.

Claim 56 (Original): A vaccine for protecting a mammalian host against infection comprising the recombinant adenovirus vector of claim 11 and a pharmaceutically acceptable

excipient.

Claim 57 (Original): A vaccine for protecting a mammalian host against infection comprising the recombinant adenovirus vector of claim 26 and a pharmaceutically acceptable excipient.

Claim 58 (Original): A vaccine for protecting a mammalian host against infection comprising the recombinant adenovirus vector of claim 42 and a pharmaceutically acceptable excipient.

Claim 59 (Original): A method for preparing a porcine adenovirus comprising, culturing a recombinant porcine adenovirus vector which is deleted in a porcine adenovirus sequence(s) essential for encapsidation, such that the vector is not capable of being encapsidated, wherein said adenovirus vector is optionally deleted in nucleic acid encoding adenoviral proteins necessary for replication; in the presence of a helper virus that comprises nucleic acid for the porcine adenovirus sequence essential for encapsidation and optionally any adenovirus protein necessary for replication of said adenovirus, under conditions suitable for production of viral particles; and optionally recovering said viral particles.

Claim 60 (Original): A method for preparing an adenovirus comprising culturing an adenovirus vector which comprises a porcine adenovirus sequence(s) essential for encapsidation, wherein said porcine adenovirus sequence(s) essential for encapsidation is heterologous to said adenovirus vector, under conditions suitable for production of viral particles; and optionally recovering said viral particles.

Claim 61 (Original): A method for preparing an adenovirus comprising culturing an adenovirus vector which comprises a deletion and/or addition of part or all of one or more E1 transcriptional control regions comprising culturing the adenovirus vector under conditions suitable for production of viral particles; and optionally recovering said viral particles.

Claim 62 (Original): The method of claim 59 wherein said adenovirus vector further comprises a transgene.

Claim 63 (Original): The method of claim 60 wherein said adenovirus vector further comprises a transgene.

Claim 64 (Original): The method of claim 61 wherein said adenovirus vector further comprises a transgene.